HYPERTENSION IN KIDNEY DONOR

AHMED HASSAN NEAMATALLA,MD
UROLOGY & NEPHROLOGY CENTER
MANSOURA UNIVERSITY

Agenda

- Introduction.
- Pre donation Hypertension.
- Post donation Hypertesion.

Introduction

- Kidney transplantation is the treatment of choice for end-stage renal disease *Suthanthiran* 1994.
- A successful kidney transplant improves the quality of life and reduces the mortality risk for most patients, when compared with maintenance dialysis. *Wolfe RA* 1999.
- There is, however, a shortage of donated organs and a growing wait list for transplantation *Xue JL* 2001.
- As a result patients are waiting longer to receive a kidney transplant and there are an increasing number of older patients with more comorbidities on the waitlist.

- The number of patients awaiting renal transplantation in the United States steadily has increased over time.
- The gap between allograft supply and demand continuing to widen.
- An increase in the number of living donors (including living-unrelated donors) may ameliorate this trend ***Delmonico. Am J Transplant 2005.***
- The presence of well controlled primary or essential hypertension in an otherwise low-risk candidate over 50 years of age is not a contraindication to kidney donation.***OPTN, 2007***

- Evaluation of the potential kidney donor is a complex activity that differs substantially from other types of preoperative assessments.
- The well being of the donor, who derives no medical benefit from this surgery, must be assured in both the short term and long term, and the potential adverse consequences to the recipient must be determined as well.
- The criteria that must be met for a person to donate a kidney are rigorous and include medical, social, psychosocial, ethical, and legal issues.
- Donor evaluation can be divided into assessments to protect the health and safety of the donor and assessments to protect the health and safety of the recipient.
- A careful assessment of risks and benefits to both the donor and recipient can lead to favorable outcomes.

Mala Sachdeva *Journal of Transplantation,2011*.

-

Pretransplant Evaluation of the Living Kidney Donor

- For donors, at least two blood pressure readings on two separate occasions should be performed .***P. C. T. Pham,et. al,2007***

A donor who has any elevated blood pressure reading is generally sent for 24 hr ambulatory blood pressure monitoring to rule out white coat hypertension or to confirm the abnormal finding.

- A donor with a history of hypertension should undergo further evaluation and questioning. If that donor is on two or more medications, he is generally excluded. ***D. A. Mandelbrot,et.al,2007***
- If that donor is on one medication, then he can continue as a donor as long as he does not have evidence of target end organ damage.

- According to the 2007 survey, 41% of centers consider donors with well-controlled hypertension on one medication and only 8% will consider donors on two medications. ***D. A. Mandelbrot,et.al, 2007.***

American Journal of Transplantation *2007*.

- For the donors on one antihypertensive agent, documenting the absence of microabuminuria, left ventricular hypertrophy, or other cardiac disease, dyslipidemia, obesity, or ophthalmologic changes characteristic of hypertension is imperative.

- In addition, this donor must demonstrate that his blood pressure had been well controlled for at least six months prior to evaluation and that he will have proper followup postdonation for his blood pressure.

- Racial variations in the development of hypertension and CKD in African Americans and Hispanics have been described postdonation.

- Because hypertension may have poorer outcomes in African Americans and Hispanics, ethnicity may play a role in excluding a larger proportion of this population of hypertensive potential donors or even these potential donors with an increased risk of developing hypertension.

K. L. Lentine, et al., *NEJM,*2010.

Prehypertensive Donor

- It is uncertain what to do with donors who are labeled as prehypertensive.
- These donors are counseled in detail about lifestyle modification and their increased risk of developing hypertension and cardiovascular disease.
- Of these who choose to donate, postnephrectomy followup by their primary care provider should be suggested.

Donor with family history of hypertension

- Individuals with a family history of hypertension are again counseled, as there is a genetic predisposition to developing hypertension.

- Both paternal and maternal hypertension are strongly associated with the development of hypertension during adult life. ***N. Y. Wang,2008***.

- Careful counseling and risk analysis should be done before these donors proceed.

Pre donation Hypertesion

Table 1: Summary of pretransplant donor evaluation.

Donor screening components	Rationale
Screening to Protect the Donor	
Medical	
General medical/Cardiac preop assessment	Perioperative and long-term risks
Diabetes Mellitus	Risk of chronic kidney disease, cardiovascular disease
Hypertension	Risk of chronic kidney disease, cardiovascular disease
Age	Risk of chronic kidney disease
Pregnancy	Rick of complications during pregnancy
Renal	
Glomerular filtration rate	Risk of chronic kidney disease
Proteinuria	Risk of chronic kidney disease
Hematuria	Risk of chronic kidney disease
Nephrolithiasis	Risk of kidney disease (acute and chronic)
Lifestyle	
Overweight and obesity	Metabolic, cardiovascular risks
Smoking	Cardiovascular and possible renal risks
Assessment for high risk behaviors	Long-term medical risks
Psychosocial	
Psychosocial and psychiatric issues	Short term and long-term exacerbation
Informed consent	Risks related to not understanding, coercion
Donor screening to protect the recipient	
Medical	
Infection	Risk of transmission of infection to recipient
Malignancy	Risk of transmission of malignancy to recipient
Renal	Risk of donor derived kidney disease
Lifestyle	
Assessment for high-risk behaviors	Potential for transmission of an unidentified infectious agent

A Report of the Amsterdam Forum On the Care of the Live Kidney Donor: Data and Medical Guidelines

Kidney transplant physicians and surgeons met in Amsterdam, The Netherlands, from April 1–4, 2004 for the International Forum on the Care of the Live Kidney Donor. Forum participants included over 100 experts and leaders in transplantation representing more than 40 countries from around the world, including participants from the following continents: Africa, Asia, Australia, Europe, North America, and South America.

(*Transplantation* 2005;79: S53–S66)

- Hypertension has been considered to be a contraindication in potential renal transplant donors.

- However, the precise risk to donors who have borderline elevation in blood pressure (BP) and those with a family history of hypertension has not been conclusively determined.

- ***Greg Obrador*** noted that the threshold values for hypertension are different depending on the technique used to measure BP.

- Ambulatory blood pressure monitoring (ABPM) was reported by Fatma Nurhan Ozdemir to be more accurate than in-office blood pressure measurement (OBPM) in recording true potential donor BP

Ozdemir FN *Nephrol Dial Transplant* 2000

- ***Gil Thiel*** reported 18 donors who were hypertensive at the time of nephrectomy.
- At 7 years following nephrectomy,10 of the 18 donors were on antihypertensive treatment (five donors with one medication, three donors with two medications, and two donors with three medications).
- One-third of these 18 donors (hypertensive at donation) were normotensive at 7 years following nephrectomy without any treatment.
- Thus, hypertension at the time of nephrectomy may have been due to stress conditions before donation

- In contrast, among 73 normotensive donors at the time of nephrectomy, only 15 were on antihypertensive treatment (12 donors on one medication, two donors on two medications, and one donor on three medications) at 7 years after nephrectomy.
- The outcome (renal function) of the 18 donors determined to be hypertensive at nephrectomy was no different than the 75 normotensive donors.

- At 7 years, the mean estimated creatinine clearance for the hypertensive donor group was not statistically different for the initially normotensive group

Textor SC, et al.*Transplantation,*2004.

- ***Mark Stegall*** reported upon the recent Mayo Clinic experience.
- The GFR of 25 hypertensive donors was not statistically different than 150 normotensive donors prior to nephrectomy or at 1 year postdonation .***Textor SC, et al***.
- Blood pressure was easily controlled in hypertensive donors with an angiotensin receptor blocker and diuretics; none had microalbuminuria.

- The following consensus guidelines regarding hypertensive donors were adopted:-

- Patients with a BP 140/90 by ABPM are generally not acceptable as donors.

- BP should preferably be measured by ABPM, particularly among older donors (50 years) and/or those with high office BP readings.

- Some patients with easily controlled hypertension who meet other defined criteria (e.g., 50 years of age, GFR 80 ml/min, and urinary albumin excretion 30 mg/day) may represent a low-risk group for development of kidney disease after donation and may be acceptable as kidney donors.

- Donors with hypertension should be regularly followed by a physician.

Post Donation Hypertension

- The proportion of hypertensive donors over the past 40 years has remained static at 5%–8%,
- Suggesting persistent reservations about potentially adverse consequences of predonation hypertension on donor outcomes.

Taler SJ,et al., Am J Transplant, 2013

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Long-Term Consequences of Kidney Donation

Hassan N. Ibrahim, M.D., Robert Foley, M.B., B.S., LiPing Tan, M.D., Tyson Rogers, M.S., Robert F. Bailey, L.P.N., Hongfei Guo, Ph.D., Cynthia R. Gross, Ph.D., and Arthur J. Matas, M.D.

- From November 1963 through December 2007, a total of 3698 nephrectomies in living donors were performed at the University of Minnesota.
- Potential donors had to be free from diabetes and hypertension and have a GFR greater than 80 ml per minute per 1.73 m^2 of body-surface area — requirements that reflect the practice at most transplantation centers.
- Donors provided a complete history and underwent a physical examination,as well as renal and vascular imaging.
- They underwent a comprehensive laboratory assessment to rule out liver disease, active infections, and systemic illnesses.
- No potential donor with any albuminuria (defined as a urinary albumin-tocreatinine ratio of >0.02 on more than one occasion) was accepted.

Table 3. Health Status of Kidney Donors More Than 20 Years after Donation.*

	Kidney Donors with GFR Measurement (N=55)	Controls (N=55)	Kidney Donors without GFR Measurement (N=1035)†	P Value‡
Age (yr)	57.7±9.8	57.7±9.8	61.9±11.6	—
Female sex (%)	64.1	64.1	57.6	—
White race (%)	98	98	98	—
Body-mass index >30 (%)§	32.0	32.0	31.8	—
Blood pressure				
Systolic (mm Hg)	121.3±16.1	128.7±21.3	126.9±15.8	0.02
Diastolic (mm Hg)	72.5±10.5	68.5±17.9	75.8±9.7	0.16
Systolic ≥140 mm Hg or diastolic ≥90 mm Hg (%)	24.5	22.6	23.2	0.80
GFR (ml/min/1.73 m^2)¶	62.7±12.6	76.1±16.5	65.2±9.5	<0.001
Urinary albumin-to-creatinine ratio				
Natural-log–transformed value	2.22±1.7	2.28±1.0	NA	0.81
>0.03 (%)	17.3	11.3	NA	0.36
Hemoglobin (g/dl)	13.8±1.3	14.5±1.3	14.0±1.9	<0.001
Glucose (mg/dl)	90.9±9.8	102.3±16.2	100.6±25.9	<0.001
Cholesterol (mg/dl)	186.4±38.1	205.4±35.1	200.5±41.4	0.01
Triglycerides (mg/dl)	112.7±60.3	153.8±80.3	138.1±93.2	<0.01
High-density lipoprotein cholesterol (mg/dl)	50.3±17.4	54.4±16.4	54.7±17.6	0.12
Clinical conditions (%)‖				
Diabetes	5.7	11.3	7.1	0.17
Cancer	11.3	15.1	13.4	0.56
Coronary heart disease	3.8	9.4	4.5	0.17
Cerebrovascular accident or transient ischemic attack	1.9	3.8	1.9	0.56
Use of antihypertensive drugs (%)‖	39.6	37.7	40.4	0.85
Current smoker (%)‖	15.1	11.3	15.7	0.52

- In conclusion, the study indicates that kidney donors have a normal life span, a health status that is similar to that of the general population, and an excellent quality of life.

- They do not have an excessive risk of ESRD. The majority of donors in the study had a preserved GFR, and their rates of albuminuria and hypertension were similar to those of matched controls.

BRIEF COMMUNICATION www.jasn.org

The Association of Predonation Hypertension with Glomerular Function and Number in Older Living Kidney Donors

Colin R. Lenihan,* Stephan Busque,† Geraldine Derby,* Kristina Blouch,* Bryan D. Myers,* and Jane C. Tan*

*Division of Nephrology, Department of Medicine and †Department of Surgery, Stanford University School of Medicine, Palo Alto, California

J Am Soc Nephrol 26: ●●●–●●●, 2014. doi: 10.1681/ASN.2014030304

The effect of preexisting hypertension on living donor nephron number has not been established.

In this study, They determined the association between preexisting donor hypertension and glomerular number and volume and assessed the effect of predonation hypertension on postdonation BP, adaptive hyperfiltration, and compensatory glomerular hypertrophy.

They enrolled 51 living donors to undergo physiologic, morphometric, and radiologic evaluations before and after kidney donation.

To estimate the number of functioning glomeruli (NFG), They divided the whole-kidney ultrafiltration coefficient (Kf) by the single-nephron ultrafiltration coefficient (SNKf).

Ten donors were hypertensive before donation. They found that, in donors ages .50 years old, preexisting hypertension was associated with a reduction in NFG.

In a comparison of 10 age- and sex-matched hypertensive and normotensive donors, they observed more marked glomerulopenia in hypertensive donors ($P=0.02$).
They observed no difference in the corresponding magnitude of postdonation BP, hyperfiltration capacity, or compensatory renocortical hypertrophy between hypertensive and normotensive donors.

BJUI
BJU International

Long-term follow-up of living kidney donors: a longitudinal study

Amgad E. El-Agroudy, Alaa A. Sabry, Ehab W. Wafa, Ahmed H. Neamatalla, Amani M. Ismail, Tarek Mohsen, Abd Allah Khalil, Ahmed A. Shokeir and Mohamed A. Ghoneim

Urology & Nephrology Center, Mansoura University, Mansoura, Egypt

Accepted for publication 13 April 2007

Study Type – Therapy (outcomes research)
Level of Evidence 2c

OBJECTIVE

To analyse retrospectively the general health status and renal and cardiovascular consequences of living-related kidney donors. Seventy-five (22.1%) donors became hypertensive and the rate was higher in donors with an interval of >25 years from donation; 174 (51.3%) of patients became either overweight or obese. Diabetes mellitus developed in 23 (6.8%) and was more common in patients with significant weight gain.

follow-up clinic starting in 2004. We attempted to contact all donors to determine the long-term outcome of their remaining kidney. All kidney donors who responded had a detailed assessment, and were questioned about rehabilitation and their feelings on donating a kidney. The data were compared to the age-matched health tables of the Egyptian general population.

Conclusions

- The final decision for transplantation should respect the donor's autonomy and decision to donate, the recipient's right to accept, and the respective transplant teams' medical decision making to proceed for living donor transplantation.
- All parties involved must be free of coercion.
- The risk and benefit analysis for the donor should be to provide more good than harm. If the opposite is the case, then transplantation should not proceed.
- The task may be difficult but if done carefully will result in good outcomes.

Mala Sachdeva,et.al,J Transplant.2011


Thank You